ENVIRONMENTAL IMPACTS OF WIND FARM DEVELOPMENT (A CONTEXT)

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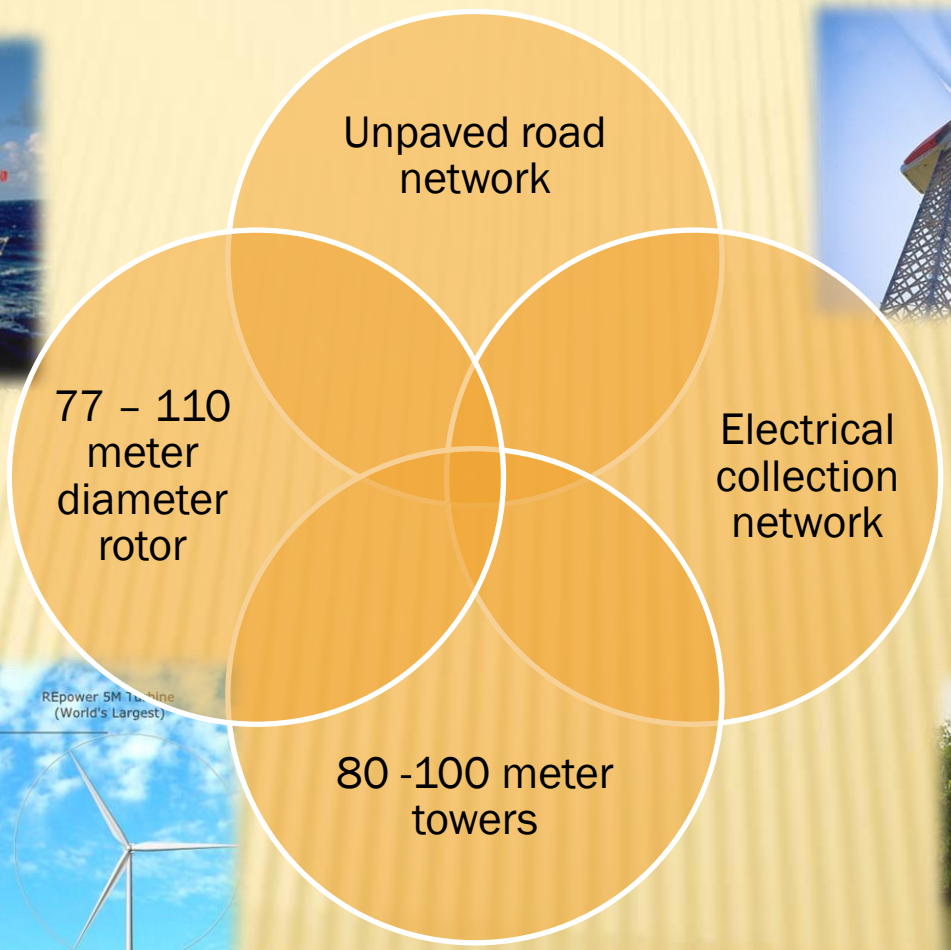
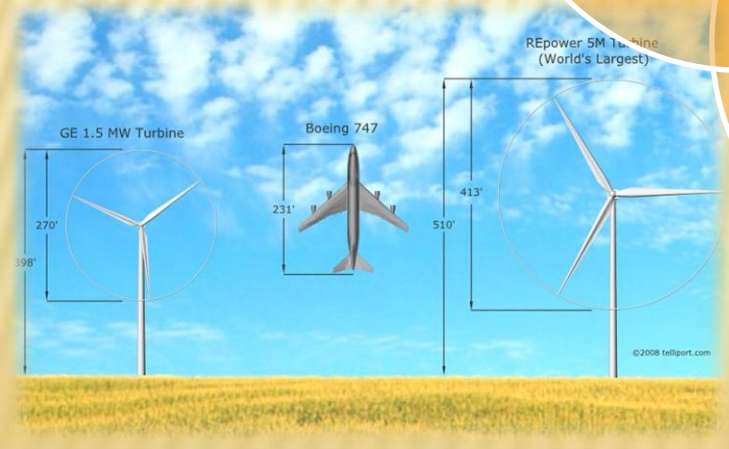
UTILITY-SCALE WIND FARM COMPONENTS





ROAD NETWORK

- 18 -24’ wide
- Less than 1% of the project area
- Sited to avoid sensitive resources
- Gravel or aggregate base
- Drainage system designed for runoff control
- Speed limits set
- Use/ improve existing roads

ELECTRICAL COLLECTION/TRANSMISSION SYSTEM NETWORK

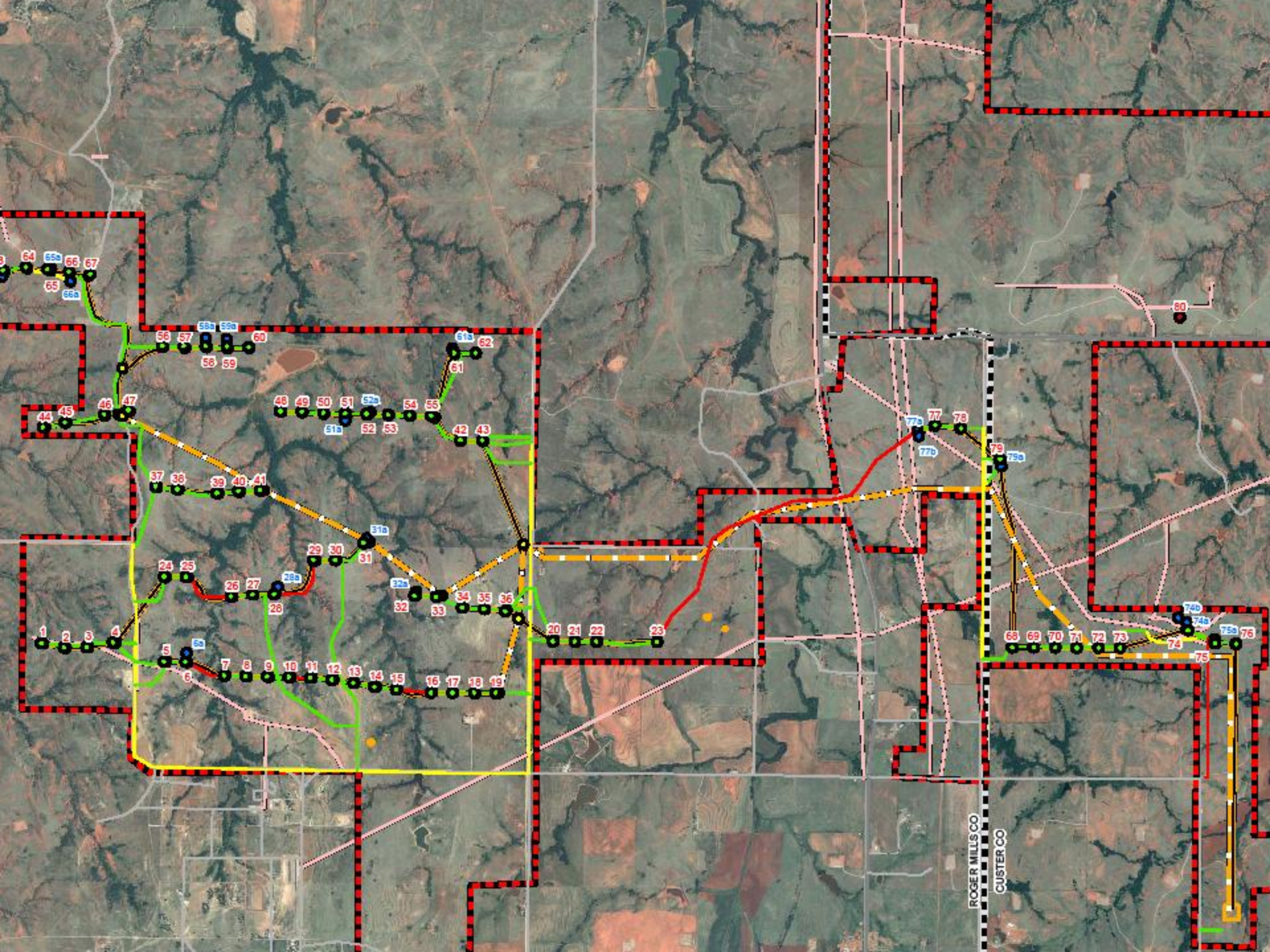
- Cables are buried
- Use road ROW to bury cables in
- Directional drill under waterways

80 – 100 METER TOWERS

- Painted standard off-white
- Placed on ridges where the winds are optimal
- Can be seen from surrounding areas
- No lattice framework for turbines
- Temporary Met towers
- No guy wires or marked

77-110 METER ROTOR

- Spins at 14 – 20 rpm
- Does not exhibit “blade blur”
- Painted standard off-white color
- Advanced design to maximize available wind


ROGER MILLS CO
CUSTER CO

POTENTIAL IMPACTS

- Noise
  - Perform acoustical analyses to determine if noise will be above ambient level
- Visual
  - Very subjective
  - Subject to local guidelines

- Avian Mortality
  - Surveys to site projects in appropriate areas
  - Complicated by CEC guidelines
  - California has Fully Protected Species

IMPACTS TEND TO BE STIGMATIC

- Turbines were noisy
- Turbines were unsightly and crowded
- Blades were spinning like desk fans
- Some projects killed unexpected numbers of birds/bats
- Companies did not employ permitting professionals

CHANGES IN TECHNOLOGY

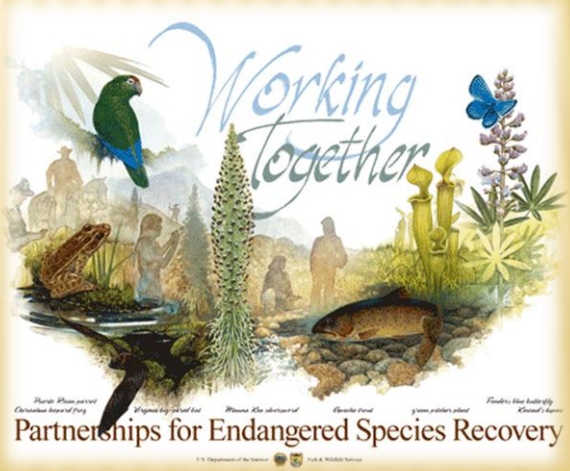
- Larger generators – *less turbines*
- Spaced carefully
- Turn more slowly – easy to avoid
- State of the art engineering reduced noise
- Design done to blend more with landscape

PROBLEMS ARISE DUE TO STIGMA

- Extended Permitting Timelines
- Enormous Cost
- Special Interest Groups Overly Involved
- Appeals not based on EIR or site-specific assessments
- Failure to address the increased demand for energy by using alternatives
- Excessive and inappropriate mitigation measures

WE ARE LOSING TOUCH WITH THE ISSUES

- Principles of Wildlife Management
  - Clear direction for species and ecosystem sustainability
  - How we manage our natural resources given competing demand constraints
  - Trade offs between natural resources and societal needs
- Principles of Resource Economics
  - Identify the resources and scarcity
  - Value the resources based on demand
  - Allocate the resources based on demand and supply
- Developing Alternatives to MORE IMPACTIVE forms of energy production
  - Reduce fuel consumption
  - Reduced emissions
  - Reduced footprint
  - Reduced by products



WE KNOW WHAT COAL LOOKS LIKE
WHERE WE BURN IT

AND WIND WHERE WE HARNESS IT

BUT.....

WHAT DOES IT LOOK LIKE WHERE WE GET COAL?

...AND WHERE WE GET WIND

SHALL WE DISCUSS THE TRADE OFFS?

“MITIGATION IS THE PAVEMENT ON THE ROAD TO HELL”

-Unknown

Design is the key to meeting our continued demand for energy while conserving our Nation’s resourced